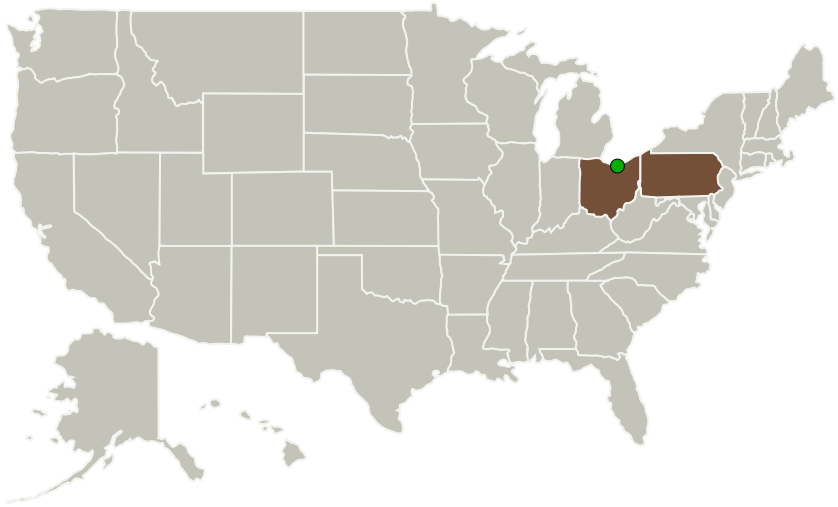
Innovative High Temperature Heat Pipes for Spacecraft Nuclear Fission Systems, Phase I

Completed Technology Project (2012 - 2012)

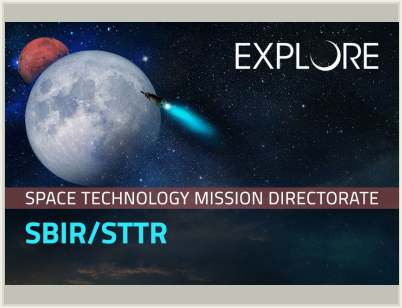
Project Introduction

NASA Glenn is examining small fission reactors for future space transportation and surface power applications. The reactors would have an 8 to 15 year design life that could be available for a 2020 launch to support future NASA science missions. Both 1 kWe thermoelectric and 3 kWe Stirling systems have been examined. The proposed design will use alkali metal heat pipes to transfer heat from the reactor to the Stirling or Thermoelectrics (TEs) convertors. This SBIR project by ACT will develop alkali metal heat pipes for space nuclear fission reactors. Three types of alkali metal heat pipes will be investigated over the course of the 6 month Phase I program; arterial heat pipes, grooved heat pipes and self-venting arterial heat pipes that use a screen wick artery with vent holes. Grooved and self-venting heat pipes will be fabricated and tested to determine which design would be best suited for the space fission reactor application.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Advanced Cooling Technologies, Inc.	Lead Organization	Industry	Lancaster, Pennsylvania
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



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Primary U.S. Work Locations	
Ohio	Pennsylvania

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140316)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Advanced Cooling Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Kara L Walker

Co-Investigator:

Kara Walker

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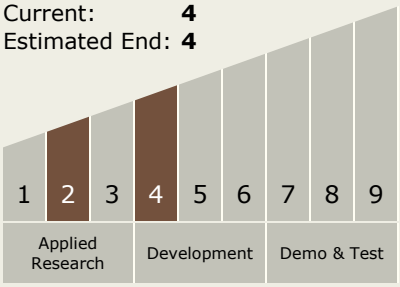
Completed Technology Project (2012 - 2012)

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.3 Heat Rejection and Storage

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System